

THE ACUTE OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURE

Its natural course and characteristics

Akademisk avhandling
som för avläggande av medicine doktorsexamen
vid Sahlgrenska akademien vid Göteborgs universitet
kommer att offentligen försvaras i Förmaket,
Sahlgrenska universitetssjukhuset/Sahlgrenska, Göteborg,
fredagen den 13 mars, 2009, kl 9.00

av
Nobuyuki Suzuki

Fakultetsopponent:
Professor Sari Ponzer, Karolinska Institutet
Stockholm, Sverige

Avhandlingen baseras på följande delarbeten:

- I. **The course of the acute vertebral body fragility fracture: its effect on pain, disability and quality of life during 12 months.**
Suzuki N, Ogikubo O, Hansson T. (2008) Eur Spine J 17(10): 1380-90
- II. **The prognosis for pain, disability, activities of daily living and quality of life after an acute osteoporotic vertebral body fracture: Its relation to fracture level, type of fracture and grade of fracture deformation.**
Suzuki N, Ogikubo O, Hansson T. (2009) Eur Spine J 18(1): 77-88
- III. **Previous vertebral compression fractures add to the deterioration of disability and quality of life after an acute compression fracture.**
Suzuki N, Ogikubo O, Hansson T. Eur Spine J (submitted)
- IV. **Characteristics of the acute and prevalent osteoporotic vertebral compression fractures.**
Suzuki N, Hansson T. Eur Spine J (submitted)



UNIVERSITY OF GOTHENBURG

THE ACUTE OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURE

Its natural course and characteristics

Nobuyuki Suzuki

Department of Orthopaedics, Institute of Clinical Sciences
at Sahlgrenska Academy, University of Gothenburg,
Göteborg, Sweden, 2009

Aim: The overall aim of this thesis was to investigate the natural course and the characteristics of the acute osteoporotic vertebral compression fracture in order to better understand and improve treatment for this type of fracture.

Patients and methods: Eligible patients were all patients over 40 years of age who sought medical care at the emergency unit at Sahlgrenska University Hospital (studies I-III) or referred to the X-ray Department at Capho Diagnostic Center (study IV) because of back pain with a radiographically-confirmed acute vertebral body fracture which resulted from a low energy trauma. In studies I-III, a total of 107 patients were followed over one year using postal questionnaires. In study IV, a total of 448 patients were included. The pain, disability, ADL, and QoL were measured after 3 weeks, and 3, 6 and 12 months (studies I-III). The patient and fracture characteristics on the first X-ray visit were evaluated in all the studies.

Results: Studies I-III. For all the outcome measures, the largest improvements, 10-15%, occurred between 3 weeks and 3 months. Thereafter, all the outcome measures levelled off or even worsened. One year after the fracture event, the patients' conditions were poor: 60.5 for the pain intensity score, 53.9 for the disability score, 47.6 for the ADL score, and 0.52 for EQ-5D. These average values are similar to values seen preoperatively in patients with a herniated lumbar disc disease or in patients who are 100% disabled from work due to back or neck problems. The most influential factors were the initial fracture deformation severity and the number of previous fractures, whereas fracture level, fracture type, and gender influenced to a lesser extent.

Study IV. The acute fracture characteristics were similar to those found in previous population-based studies of incident and prevalent fractures and in studies I-III. In the prevalent fracture analysis, concave fractures were frequent below L2 whereas wedge fractures were more frequent above L2. Mildly deformed fractures increased in the caudal direction and moderately deformed fractures increased in the cranial direction. Severely deformed fractures were frequent in the mid-thoracic spine and at the thoracolumbar junction.

Conclusions: One year after the acute fracture, it was striking to find that 76% of the patients still had a high pain intensity and the mean QoL score was 35% lower than the population value for the same age group. This finding is quite different from the generally believed good prognosis for such a fracture. There is potential for better treatment. The relationship between the poor outcomes and the initial fracture deformation severity specifically suggests the indication for invasive treatment, such as vertebroplasty or kyphoplasty.

Keywords: Vertebral body fracture, Osteoporosis, Pain, Quality of life, Disability, Compression fracture, Prognosis, Treatment, Prevalent fracture, Epidemiology

Correspondence to: Nobuyuki Suzuki, Avdelningen för Ortopedi, Institutionen för kliniska vetenskaper, Sahlgrenska akademien, Bruna stråket 11, Sahlgrenska Universitetssjukhuset, 413 45 Göteborg. or Department of Orthopaedic Surgery, Nagoya City University Graduate School of Medical Sciences, 1-Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya, Aichi 467-8601, Japan.
Email: nobmayu@mac.com

ISBN: 978-91-628-7715-6